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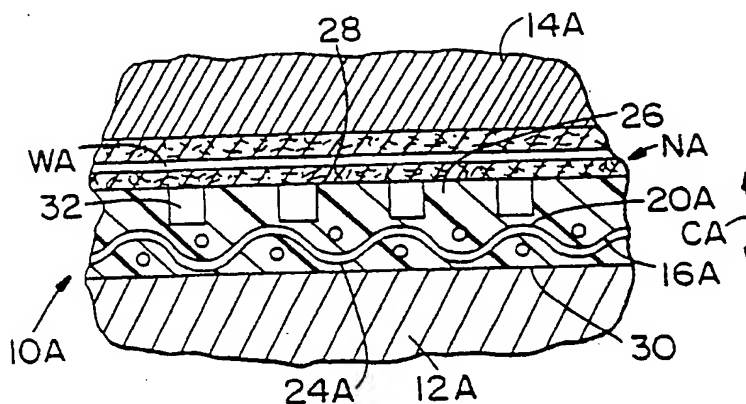
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(54) A bearing blanket for an extended nip press.

(57) A bearing blanket (10A) is disclosed which extends through an extended nip (NA) defined by a shoe (12A) and a cooperating backing roll (14A) for pressing water from a formed web (WA). The blanket (10A) includes a woven-base fabric (16A) which defines a web-side (20A) and a shoe-side (24A), and a single liquid impervious urethane layer (26) which is applied to the web-side (20A) of the base fabric (16A) such that the urethane layer (26) thoroughly penetrates into and through the base fabric (16A). The arrangement is such that when the urethane

layer (26) is cured, the urethane layer (26) defines a web face (28) and a shoe face (30). The web face (28) is spaced relative to the web-side (20A), with the web face, (28) defining a plurality of vents (32) for conveying water pressed from the web (WA) away from the extended nip (NA). The shoe face (30) is substantially co-planar with the shoe-side (24A) of the base fabric (16A) such that the shoe face (30) is relatively smooth for cooperating with and moving relative to the shoe (12A).

FIG. 2



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This invention relates to a bearing blanket which extends through an extended nip defined by a shoe and a cooperating backing roll for pressing water from a formed web.

More particularly, the present invention relates to a bearing blanket including a woven-base fabric and a liquid impervious urethane layer applied to the base fabric.

Bearing blankets are used for pressing water from a formed web during passage of the web through an extended nip press.

An extended nip press includes a press shoe and a cooperating backing roll for defining therebetween an extended nip. The press shoe defines a concave surface which cooperates with the outer surface of the backing roll such that when an endless looped bearing blanket extends through the extended nip, the bearing blanket is permitted to move with a web supported thereon through the extended nip. The interface between the bearing blanket and the shoe is lubricated to permit relative movement therebetween and the blanket together with one or more felts supports the web during transit of the web through the extended nip.

In the prior art, bearing blankets have been typically manufactured by training a base fabric around spaced rollers and applying a first coating of urethane to one side of the base fabric.

The urethane coating is then cured and optionally grooved. The base fabric with the first coating is subsequently turned inside out so that the other side of the base fabric can be coated.

Not only is the aforementioned manufacturing process relatively time consuming and complex, but more particularly, such prior art proposals have resulted in a bearing blanket having two urethane layers thereon with the attendant thickness thereof.

Such undue thickness and the provision of two such layers has resulted in the delamination of the urethane layers under extended usage of the bearing blanket.

Additionally, reversing of the bearing blanket in order to coat the opposite side of the base fabric has proved cumbersome. Problems have been experienced when manufacturing a bearing blanket suitable for use in the so-called apple type ENP disclosed in U. S. Patent No. RE31,923 to Justus. A blanket of the aforementioned type typically has a circumference of 4 m (13 feet) and a width of up to 10.7 m (35 feet). Turning such a blanket inside out without damaging the urethane layer applied thereon has proved to be difficult.

The present invention overcomes the aforementioned inadequacies of the prior art proposals by applying a single layer of urethane to a base fabric such that the urethane penetrates into and through the base fabric to provide a smooth shoe contacting face and a subsequently grooved web

face.

Such single layered bearing blanket has a thickness which is substantially less than the thickness of the double layered prior art proposals and does not require the reversing step during manufacture thereof.

Therefore, it is the primary object of the present invention to provide a bearing blanket that overcomes the aforementioned inadequacies of the prior art proposal and which makes a significant contribution of the art of extended nip pressing.

Another object of the present invention is the provision of a bearing blanket having a single urethane layer so that the thickness of the blanket is minimized thereby inhibiting delamination of the resultant blanket.

Another object of the present invention is the provision of a bearing blanket in which a single layer of urethane is applied to a base fabric such that reversing of the blanket during manufacture thereof is avoided.

Another object of the present invention is the provision of a bearing blanket in which the web face is provided with a plurality of parallel-spaced grooves with grooves adjacent to the lateral edges of the blanket being ground-off in order to relieve the stresses applied to the blanket during multi-plane bending of the blanket while extending through an extended nip.

Other objects and advantages of the present invention will be apparent to those skilled in the art by consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings.

The present invention relates to a bearing blanket and a method of manufacturing the same, the blanket extending through an extended nip defined by a shoe and a cooperating backing roll for pressing water from a formed web. The blanket includes a woven-base fabric which defines a web side and a shoe side.

Additionally, the blanket includes a single liquid impervious urethane layer which is applied to the web side of the base fabric such that the urethane layer thoroughly penetrates into and through the base fabric so that when the urethane layer is cured, the urethane layer defines a web face and a shoe face.

The web face is spaced relative to the web side and the web face defines a plurality of venting means for conveying water pressed from the web away from the extended nip. The shoe face is substantially co-planar with the shoe side of the base fabric such that the shoe face is relatively smooth for cooperating with and moving relative to the shoe.

In a more specific embodiment of the present invention, the base fabric is manufactured from

nylon filaments, and the urethane layer has a hardness within the range 85 - 100 on the Shore A hardness scale.

The plurality of venting means include in a preferred embodiment to the present invention a plurality of parallel spaced grooves with the grooves extending in a machine direction.

In an alternative embodiment of the present invention, the parallel grooves extend diagonally relative to a machine direction.

Each groove of the plurality of grooves has a depth within the range 0.125 cm to 0.51 cm (.05 to .2 inches) and has a width within the range 0.05 cm to 0.11 cm (.02 to .04 inches). Furthermore, the grooves are spaced relative to each other within the range 6 to 10 grooves per 2.54 cm (1 inch).

In a preferred embodiment of the present invention, the grooves which are disposed adjacent to each lateral edge of the bearing blanket are ground off such that stress applied to the blanket during multi-plane bending of the blanket while extending through the extended nip is reduced.

In another embodiment of the present invention, the plurality of venting means includes a plurality of spaced blind drilled holes for the reception therein of water pressed from the web.

The present invention also includes a method of manufacturing a bearing blanket which includes the steps of wrapping a base fabric around a smooth cylindrical mandrel and pressure applying a urethane layer onto and through the base fabric such that the shoe face of the single urethane layer is relatively smooth and co-planar with a shoe side of the base fabric while a web face of the single layer is spaced relative to a web side of the base fabric.

Many modifications and variations of the present invention will be readily apparent to those skilled in the art by a consideration of the detailed description of the preferred embodiment taken in conjunction with the annexed drawings. However, such modifications and variations fall within the spirit and scope of the present invention as defined by the appended claims.

Figure 1 is a sectional view through a prior art bearing blanket having a base fabric with a web side layer and a shoe side layer applied thereon;

Figure 2 is a sectional view of a bearing blanket according to the present invention showing a base fabric and a single urethane layer applied thereto.

Figure 3 is a plan view of the blanket shown in Figure 2;

Figure 4 is a plan view of an alternative embodiment of the present invention showing diagonal grooves; and

Figure 5 is a fragmentary sectional view show-

ing the lateral edges of the blanket shown in Figure 2.

Similar reference characters refer to similar parts throughout the various embodiments of the present invention.

Figure 1 is a sectional view of a typical prior art bearing blanket generally designated 10 for extending through an extended nip N defined between a shoe 12 and a cooperating backing roll 14 for pressing water from a formed web W.

The prior art bearing blanket 10 includes a woven base fabric 16 and a first urethane layer 18 applied to the web side 20 of the base fabric 16.

A second urethane layer 22 is applied to the shoe side 24 of the base fabric 16.

The resultant prior art bearing blanket 16 has an overall caliper C which is relatively thick resulting in premature delamination and break-down of the resultant blanket 10.

Figure 2 is a sectional view of a bearing blanket generally designated 10A according to the present invention. The blanket 10A extends through an extended nip NA defined by a shoe 12A and a cooperating backing roll 14A for pressing water from web WA.

The blanket 10A includes a woven based fabric 16A defining a web side 20A and a shoe side 24A.

A single liquid impervious urethane layer 26 is applied to the web side 20A of the base fabric 16A such that the urethane layer 26 thoroughly penetrates into and through the base fabric 16A so that when the urethane layer 26 is cured, the urethane layer 26 defines a web face 28 and a shoe face 30.

The web face 28 is spaced relative to the web side 20A. The web face 28 defines a plurality of venting means generally designated 32 for conveying water pressed from the web WA away from the extended nip NA.

The shoe face 30 of the layer 26 is substantially co-planar with the shoe side 24A of the base fabric 16A such that the shoe face 30 is relatively smooth for cooperating with and moving relative to the shoe 12A.

The base fabric 16A, as shown in Figure 2, is manufactured from nylon monofilaments and the urethane layer 26 has a hardness within the range 85 to 100 on the Shore A hardness scale.

Figure 3 is a plan view of the blanket 10A shown in Figure 2 and shows a plurality of parallel spaced grooves 34, 35, 36, 37, 38, 39, 40 with the grooves 34 to 40 extending in a machine direction as indicated by the arrow MD.

In an alternative embodiment of the present invention as shown in Figure 4, the grooves 34B, 35B, 36B, 37B, 38B, 39B, 40B extend diagonally relative to the machine direction as indicated by the arrow MD.

In both the embodiments of Figures 3 and 4,

each groove of the plurality of grooves has a depth within the range (0.125 cm to 0.51 cm (.05 to .2 inches)).

Furthermore, each groove of the plurality of grooves has a width within the range 0.05 to 0.11 cm (.02 to .04 inches) and preferably a width of 0.079 cm (.031 inches).

Additionally, the grooves are spaced relative to each other within the range 6 to 10 grooves per 2.54 cm (inch) and in a preferred embodiment have a spacing of 8 grooves per 2.54 cm (inch).

As shown in Figure 5, the plurality of parallel spaced grooves 34 to 40 include grooves 34-39 which are disposed adjacent to lateral edges 42 and 44 of the blanket 10A. Such grooves 34-39 are ground off as shown in Figure 5 such that stress applied to the blanket 10A during multi-plane bending of the blanket 10A while extending through the extended nip NA and over the lateral rotatable heads 46 and 48 is reduced.

The present invention provides a bearing blanket which is easy to manufacture and which avoids the complex process step of reversing the blanket during manufacture and more importantly provides a bearing blanket having a caliper, or thickness, CA which is considerably less than the thickness C of the counterpart prior art two layered blankets, thereby inhibiting delamination and early failure of the resultant bearing blanket.

Claims

1. A bearing blanket extending through an extended nip defined by a shoe and cooperating backing roll for pressing water from a formed web, said blanket comprising:
 - a woven-base fabric defining a web side and a shoe side;
 - a single liquid impervious urethane layer applied to said web side of said base fabric such that said urethane layer thoroughly penetrates into and through said base fabric so that when said urethane layer is cured, said urethane layer defines a web face and a shoe face;
 - said web face being spaced relative to said web side,
 - said web face defining a plurality of venting means for conveying water pressed from the web away from the extended nip; and
 - said shoe face being substantially co-planar with said shoe side of said base fabric such that said shoe face is relatively smooth for cooperating with and moving relative to the shoe.
2. A bearing blanket as set forth in claim 1 wherein said base fabric is manufactured from nylon monofilaments.
3. A bearing blanket as set forth in claim 1 wherein

said urethane layer has a hardness within the range 85 to 100 on the Shore A hardness scale.

4. A bearing blanket as set forth in claim 1 wherein said plurality of venting means includes:
 - 5 a plurality of parallel spaced grooves.
 - 5. A bearing blanket as set forth in claim 4 wherein said grooves extend in a machine direction.
 - 6. A bearing blanket as set forth in claim 4 wherein said grooves extend diagonally relative to a machine direction.
 - 7. A bearing blanket as set forth in claim 4 wherein each groove of said plurality of grooves has a depth within the range 0.125 to 0.51 cm (.05 to .2 inches).
 - 8. A bearing blanket as set forth in claim 4 wherein each groove of said plurality of grooves has a width within the range 0.05 cm to 0.11 cm (.02 to .04 inches).
 - 9. A bearing blanket as set forth in claim 4 wherein said grooves are spaced relative to each other within the range 6 to 10 grooves per 2.54 cm (inch).
 - 10. A bearing blanket as set forth in claim 5 wherein grooves of said plurality of parallel-spaced grooves disposed adjacent to each lateral edge of the bearing blanket are ground-off such that stress applied to the blanket during multi-plane bending of the blanket while extending through the extended nip is reduced.
 - 11. A bearing blanket as set forth in claim 1 wherein said plurality of venting means includes:
 - a plurality of spaced blind drilled holes for the reception therein of water pressed from the web.
 - 12. A bearing blanket as set forth in claim 1 wherein said shoe face is relatively smooth as a result of said woven-base fabric being applied to a smooth mandrel and said urethane layer being applied through said base fabric such that said shoe face corresponds with a smooth outer-cylindrical surface of said mandrel.
 - 13. A method of manufacturing a bearing blanket comprising the steps of:
 - wrapping a base fabric around a smooth cylindrical mandrel;
 - pressure applying a urethane layer onto and through the base fabric such that the shoe face of the single urethane layer is relatively smooth and co-planar with a shoe side of the base fabric while a web face of the single layer is spaced relative to a web side of the base fabric; and
 - grooving the web face of the single layer for venting an extended nip press in use of the bearing blanket.



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EUROPEAN SEARCH REPORT

Application Number

EP 90 63 0136

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-2 106 557 (ALBANY) " the whole document " - - - -	1,3,4,12	D 21 F 3/02
A	US-A-4 482 430 (MAJANIEMI) " the whole document " - - - -	1-6,11	
A	DE-A-3 318 984 (OBERDORFER) " the whole document " - - - -	1-3,12,13	
A	WO-A-8 702 080 (CRONIN) " the whole document " - - - - -	1,3-9	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D 21 F
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		05 December 90	DE RIJCK F.
<div>CATEGORY OF CITED DOCUMENTS</div> <div><div>X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention</div><div>E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document</div></div>			